What is claimed is:

1. A method for making thebaine, comprising the steps of:

(a) heating a reaction mixture comprising an acid salt of 8-methoxy-Δ^6-dihydrothebaine and an acid at a temperature and for a time sufficient to make methanol and an acid salt of thebaine;

(b) distilling the methanol; and

(c) neutralizing the acid salt of thebaine.

2. The method of claim 1, wherein the acid is present in an amount of about 0.01 to about 10 molar equivalents relative to the amount of the acid salt of 8-methoxy-Δ^6-dihydrothebaine.

3. The method of claim1, wherein the temperature is from about 85° C to about 120°C.

4. The method of claim 1, wherein the time is from about 1 hour to about 20 hours.

5. The method of claim 1, wherein the acid is methanesulfonic acid, ethanesulfonic acid, trifluoromethanesulfonic acid, benzenesulfonic acid, *p*-toluenesulfonic acid, *p*-bromobenzenesulfonic acid, *p*-nitrobenzenesulfonic acid, *p*-trifluoromethylsulfonic acid.

6. The method of claim 1, wherein the reaction mixture further comprises a solvent.

7. The method of claim 6, wherein the concentration of the acid salt of 8-methoxy-Δ^6-dihydrothebaine is from about 0.01 moles to about 3 moles per liter of solvent.

8. The method of claim 1, wherein the neutralizing comprises contacting the acid salt of thebaine with a base.

9. The method of claim 8, wherein the base is aqueous sodium hydroxide.

10. The method of claim 6, wherein the solvent forms an azeotrope with methanol.

11. The method of claim 10, wherein the solvent is selected from the group consisting of toluene, benzene, xylene, heptane, acetone, 2,5-dimethylfuran, ethylbutyl ether, methyl acetate, nitromethane, octane, trichloroethylene, and 1,1,2-trichlorotrifluoroethane.

12. The method of claim 1, wherein the reaction mixture further comprises an acid salt of codeinone dimethyl ketal.

13. The method of claim 12, wherein the acid is present in an amount of about 0.01 to about 10 molar equivalents relative to the total amount of the acid salt of 8-methoxy-Δ^6-dihydrothebaine and the acid salt of codeinone dimethyl ketal.

14. The method of claim 1, wherein the reaction mixture further comprises an acid salt of neopinone dimethyl ketal.

15. The method of claim 14, wherein the acid is present in an amount of about 0.01 to about 10 molar equivalents relative to the total amount of the acid salt of 8-methoxy-Δ^6-dihydrothebaine and the acid salt of neopinone dimethyl ketal.

16. The method of claim 12, wherein the reaction mixture further comprises an acid salt of neopinone dimethyl ketal.

17. The method of claim 16, wherein the acid is present in an amount of about 0.01 to about 10 molar equivalents relative to the total amount of the acid salt of 8-methoxy-Δ^6-dihydrothebaine, the acid salt of codeinone dimethyl ketal, and the acid salt of neopinone dimethyl ketal.

18. A method for making thebaine comprising the steps of:

(a) heating a reaction mixture comprising an acid salt of codeinone dimethyl ketal and an acid at a temperature and for a time sufficient to make methanol and an acid salt of thebaine;

(b) distilling the methanol; and

(c) neutralizing the acid salt of thebaine.

19. The method of claim 18, wherein the acid is present in an amount of about 0.01 to about 10 molar equivalents relative to the amount of the acid salt of codeinone dimethyl ketal.

20. The method of claim18, wherein the temperature is from about 85° C to about 120°C.

21. The method of claim 18, wherein the time is from about 1 hour to about 20 hours.

22. The method of claim 18, wherein the acid is methanesulfonic acid, ethanesulfonic acid, trifluoromethanesulfonic acid, benzenesulfonic acid, *p*-toluenesulfonic acid, *p*-bromobenzenesulfonic acid, *p*-nitrobenzenesulfonic acid, *p*-trifluoromethylsulfonic acid.

23. The method of claim 18, wherein the reaction mixture further comprises a solvent.

24. The method of claim 23, wherein the concentration of acid salt of codeinone dimethyl ketal is from about 0.01 moles to about 3 moles per liter of solvent.

25. The method of claim 18, wherein the neutralizing comprises contacting the acid salt of codeinone dimethyl ketal with a base.

26. The method of claim 25, wherein the base is aqueous sodium hydroxide.

27. The method of claim 23, wherein the solvent forms an azeotrope with methanol.

28. The method of claim 27, wherein the solvent is selected from the group consisting of toluene, benzene, xylene, heptane, acetone, 2,5-dimethylfuran, ethylbutyl ether, methyl acetate, nitromethane, octane, trichloroethylene, and 1,1,2-trichlorotrifluoroethane.

29. The method of claim 18, wherein the reaction mixture further comprises an acid salt of neopinone dimethyl ketal.

30. The method of claim 29, wherein the acid is present in an amount of about 0.01 to about 10 molar equivalents relative to the total amount of the acid salt of 8-methoxy-Δ^6-dihydrothebaine and the acid salt of codeinone dimethyl ketal.

31. A method for making thebaine comprising the steps of:

(a) heating a reaction mixture comprising an acid salt of neopinone dimethyl ketal and an acid at a temperature and for a time sufficient to make methanol and an acid salt of thebaine;

(b) distilling the methanol; and

(c) neutralizing the acid salt of thebaine.

32. The method of claim 31, wherein the acid is present in an amount of about 0.01 to about 10 molar equivalents relative to the amount of the acid salt of neopinone dimethyl ketal.

33. The method of claim 31, wherein the temperature is from about 85° C to about 120°C.

34. The method of claim 31, wherein the time is from about 1 hour to about 20 hours.

35. The method of claim 31, wherein the acid is methanesulfonic acid, ethanesulfonic acid, trifluoromethanesulfonic acid, benzenesulfonic acid, *p*-toluenesulfonic acid, *p*-bromobenzenesulfonic acid, *p*-nitrobenzenesulfonic acid, *p*-trifluoromethylsulfonic acid.

36. The method of claim 31, wherein the reaction mixture further comprises a solvent.

37. The method of claim 36, wherein the concentration of the acid salt of neopinone dimethyl ketal is from about 0.01 moles to about 3 moles per liter of solvent.

38. The method of claim 31, wherein the neutralizing comprises contacting the acid salt of neopinone dimethyl ketal with a base.

39. The method of claim 38, wherein the base is aqueous sodium hydroxide.

40. The method of claim 36, wherein the solvent forms an azeotrope with methanol.

41. The method of claim 40, wherein the solvent is selected from the group consisting of toluene, benzene, xylene, heptane, acetone, 2,5-dimethylfuran, ethylbutyl ether, methyl acetate, nitromethane, octane, trichloroethylene, and 1,1,2-trichlorotrifluoroethane.

42. A method for making thebaine comprising the steps of:

(a) heating a first reaction mixture comprising an acid salt of codeinone, trimethyl orthoformate, methanol, and an acid at about the reaction mixture's boiling point to provide a second reaction mixture;

(b) distilling substantially all of the methanol from the second reaction mixture to provide a third reaction mixture;

(c) heating the third reaction mixture at a temperature and for a time sufficient to make methanol and an acid salt of thebaine; and

(d) neutralizing the acid salt of thebaine.

43. The method of claim 1, wherein the third reaction mixture is heated at a temperature of from about 85° C to about 120°C.

44. The method of claim 42, wherein the amount of the acid salt of codeinone in the first reaction mixture is from about 0.01 moles to about 3 moles per liter of the reaction mixture.

45. The method of claim 42, wherein the amount of the trimethyl orthoformate in the first reaction mixture is at least about a 1.5 fold molar excess relative to the amount of the acid salt of codeinone.

46. The method of claim 42, wherein the amount of the acid in the first reaction mixture is from about 0.1 to about 10 molar equivalents relative to the amount of the acid salt of codeinone.

47. The method of claim 42, wherein the amount of the methanol in the first reaction mixture is at least about 10 molar equivalents relative to the amount of the acid salt of codeinone.

48. The method of claim 42, wherein the third reaction mixture is heated for a time of from about 1 hour to about 20 hours.

49. The method of claim 42, wherein the first reaction mixture is substantially anhydrous.

50. The method of claim 42, wherein the first reaction mixture further comprises a solvent.

51. The method of claim 43, wherein the methanol distilled in step (b) is a component of a methanol-solvent azeotrope.

52. The method of claim 51, wherein the solvent that forms an azeotrope with methanol is selected from the group consisting of toluene, benzene, xylene, heptane, acetone, acetonitrile, 2,5-dimethylfuran, ethylbutyl ether, methyl acetate, nitromethane, octane, trichloroethylene, and 1,1,2-trichlorotrifluoroethane.